II. JOINT COMMENTERS' RESPONSE TO ANS TECHNICAL STAFF REPLY COMMENTS - APPENDIX A

A. ANS Erroneously Argues That the TIA Plan Makes Obsolete Equipment That Would Otherwise be Used by Consumers.

ANS Argues: "Alcatel currently manufactures a 1-DS3 64-QAM radio in the 4 GHz band using a 10 MHz bandwidth. The change proposed in the TIA would prevent 2 GHz network operators from using a radio currently available in the market." **(7/5)**

JC Response: TIA's Plan would not prevent 2 GHz network operators from using the 1-DS3 64-QAM radio in the 4 GHz band for at least five years. By that time, the Joint Commenters' believe that there will be little demand for this radio in the 4 GHz band because substantial satellite interference will cause microwave users to migrate to the 6, 10 and 11 GHz bands. Furthermore, as illustrated in Appendix B, Figure 14, Alcatel's Plan would obsolete significantly more than one radio (manufactured by other vendors) currently in use in microwave networks. Although some equipment will be rendered obsolete under any plan, the TIA Plan would allow significantly more baseband equipment and spare parts of existing 2 GHz systems to be reused in the upper bands. Equipment reuse under the TIA Plan will significantly lower the cost of relocation for users, facilitate migration and expedite introduction of PCS.

B. The TIA Plan Will Ensure That Users Can Choose From a Diversity of Competitive Suppliers. Contrary to ANS' View, The ANS Plan Unduly Favors A Single Supplier.

ANS Argues: "The TIA Plan requires use of the 6 GHz private band before the common carrier band. This approach favors incumbent manufacturers of upper 6 GHz private radios and limits competition." **(10/7)**

JC Response: Contrary to Alcatel's suggestion, the suggested preference for use of the 6 GHz private band before the common carrier band -- which refers to narrowband channels only (5 MHz and below) -- is only intended to protect wideband channels from narrowband use wherever possible thus maximizing the number of users that can access the 6 GHz band to meet their narrowband and wideband needs. The leading manufacturers of microwave equipment, including Alcatel, manufacture equipment in both the upper and the lower 6 GHz band. Under the TIA Plan, all manufacturers, including Alcatel, would continue to compete for their share of the market as is the case today. Under the Alcatel Plan, however, ANS would become a monopoly supplier of 1.6 MHz band radios to all of the microwave equipment users that have deferred their purchases of 2 GHz equipment pending Commission adoption of technical rules for the 6 GHz band. Since the initiation

of the PCS proceeding, the 2 GHz market has suffered a precipitous drop, with no corresponding increase in sales in the bands above 2 GHz. As a consequence, there is significant pent up demand for microwave radios by users who are awaiting the Commission's decision in this proceeding. The Joint Commenters believe that the difference in revenues between these two markets ($70 million) represents the immediate market for 6 GHz equipment that could only be supplied by Alcatel, if the 1.6 MHz based channel plan is adopted. Contrary to Alcatel's assertion, therefore it is adoption of the Alcatel Plan that will severely limit competition since no other manufacturers are currently positioned to produce 1.6 MHz radios.

C. *ANS Raises Inconsistent Arguments That The TIA Plan Favors Both Wideband and Narrowband Channels. However, TIA's Plan Rationally Balances the Needs of Both Wideband and Narrowband Users.*

ANS Argues: "The narrowband proposal in the TIA Plan is totally without merit. First, it would reduce the available wideband channels by 25 percent. Since 30 MHz wideband channels already are being reduced in the 6 GHz common carrier band, this proposal unfairly would impact LOCs, interexchange carriers, and other spectrum users with wideband channel requirements." **(15/3)**

"Figure 2 shows the channelization proposed in the TIA plan for 4 GHz common carrier band. Note that all 10 MHz and lower capacity channels would be eliminated." **(7/3)**

". . . the 4 GHz TIA plan is unacceptably biased toward the wideband needs of interexchange carriers." **(7/7)**

JC Response: ANS seems unable to decide whether the TIA plan favors wideband or narrowband channels. The fact is that the TIA Plan favors neither; it balances the needs of both classes of users by providing narrowband channels in the lower 6 GHz band, and the 10 and 11 GHz bands to accommodate long haul communications systems. The TIA Plan also requires that the narrowband channels in the upper 6 GHz band be used before such channels are coordinated in the lower 6 GHz band. This requirement will preserve wideband channels (*i.e.*, 30 MHz) in the lower 6 GHz band. Additional wideband channels (40 MHz and 20 MHz only) are available in the 4 and 11 GHz band. With regard to the 4 GHz band, the TIA Plan is consistent with the industry concensus that the 4 GHz band is not a viable option for displaced 2 GHz users because of the substantial interference anticipated from satellite services located in the band.

D. Under the Pretext of "Spectral Efficiency", ANS Proposes a Plan That Disserves Users and the Competitive Equipment Market.

ANS Argument: "The FCC Plan requires a minimum of 4 DS1's in 1.6 MHz of bandwidth. This allows a total of 72 DS1's to be coordinated in a 30 MHz bandwidth. The TIA Plan requires a 4 DS1's in 2.5 MHz of bandwidth, resulting in a total of 48 DS1's per 30 MHz bandwidth. Thus, the FCC Plan is inherently more spectrally efficient." **(17/6)**

JC Response: The Commission should not be duped by the apparent efficiency of ANS' Plan. What ANS fails to mention in its conclusion that the FCC Plan (a.k.a. ANS Plan) is "inherently more spectrally efficient," is the fact that it becomes more "inefficient" as more spectrum is used. *See* Appendix B, Figure 11. In contrast, the TIA Plan becomes more efficient as more spectrum is used allowing users to expand their capacity without using more spectrum. *See* Appendix B, Figures 8 and 11 highlighting the TIA Plan's increased spectral efficiency as more spectrum is used. Under the ANS Plan, 5 and 30 MHz channels are always used to expand system capacity. *See* Appendix B, Figure 13 illustrating that Alcatel's Plan is in reality a 5 and 30 MHz plan. The need for such large amounts of spectrum to accommodate system growth necessarily limits the number of users that can use the spectrum. *See* Appendix B, Figures 11 and 12 demonstrating how the TIA Plan allows users the flexibility to upgrade their systems without additional spectrum. Moreover, the

E. ANS' Attempt to Provide a Rationale For Its 1.6 MHz Based Channel Plan is Unpersuasive and Demonstrates its Effort to Devise A Frequency Plan that Will Limit Competition.

ANS Argues: "Since the OET study relied so heavily on using the 4 GHz band to accommodate current and further displaced users of the 2 GHz band and because the amount of spectrum available for point-to-point users was being dramatically reduced, Alcatel suggested that narrowband channels be established based on the bandwidth efficiency requirements that exist in the 4 GHz band today." **(20/2)**

ANS further submits the chart below (the bolded rows were added by the Joint Commenters) to illustrate its derivation of the 1.6 MHz channel plan. **(19/4)**

N	4 GHz	6 GHz	11 GHz	Channels	DS1
1	20	30	40	1152	48
2	10	15	20	576	24
3	6.666667	10	13.33333	384	16
4	5	7.5	10	288	12
6	3.33333	5	6.666667	192	8
8	**2.5**	**3.75**	**5**	**144**	**6**
12	1.666667	2.5	3.333333	96	4
16	**1.25**	**1.875**	**2.5**	**72**	**3**
24	0.833333	1.25	1.666667	48	2
32	**0.625**	**0.9375**	**1.25**	**36**	**1.5**
48	0.416667	0.625	0.833333	24	1

Lastly, "As a compromise to manufactures who purport to have an equipment investment in 1.25 and 2.5 MHz bandwidth radios, Alcatel offers the following suggested amendment: For two years following the conclusion of these proceedings, the minimum payload capacity in 3.2 and 1.6 MHz channels is reduced by one-half to 4 DS-1's and 2 DS-1's respectively." **(20.1/3)**

JC Response: Throughout this proceeding, Alcatel has focused the Commission's attention on the spectral efficiency of its Plan. In this section, for the first time, ANS makes an effort to explain its derivation of a 1.6 MHz channel plan using the 1/N rule allowed under Part 21.122(a)(3). ANS' rationale for selecting a 1.6 MHz-based channel plan is unpersuasive. As indicated by the highlighted rows in the chart, ANS conveniently omitted factors of the 1/N rule that would clearly support a 1.25 MHz based channel plan and provide users with a diversity of suppliers. Given the industry consensus that few 2 GHz users would opt to relocate to the 4 GHz band because of interference from satellites, it is illogical to base the channel plan for all four relocation bands on the band least likely to accommodate the needs of displaced 2 GHz users.

Further, ANS' proposal of a 2-year grace period on efficiency standards to allow the Joint Commenters' 2.5 MHz/4 DS-1 radios to work in their 3.2 MHz/8 DS-1 channels and

DS3 radio in this band. This allows longer path lengths to be used. This is less of a concern for lower capacity radios, which generally have large system gains and can maintain higher spectral efficiency." **(26/1)**

JC Response: This statement highlights yet another inconsistency in the Alcatel Plan. In contrast to its earlier arguments about the "inherent efficiency" of the 1.6 MHz plan (i.e. 72 DS1's in a 30 MHz band. *See* **(17/6)**), ANS is now proposing a configuration that would only allow 56 DS1's in 30 MHz of spectrum. As noted earlier, the TIA Plan consistently becomes more spectrum efficient as more spectrum is used. *See* Appendix B, Figure 8 highlighting the spectral efficiency standard of the TIA Plan as more spectrum is used. There is one other implication with a 2 DS3 loading for 30 MHz channels. This lies in the initial loading requirement. Under the Alcatel plan 50% initial loading is required in 5 years. So after 5 years, a user could fulfill this requirement with a 1 DS-3 10 MHz radio on the center frequency of a 30 MHz channel. Consequently, one user will have effectively blocked 20 MHz of spectrum. This is not sound spectrum management. The Joint Commenters urge the Commission to adopt the TIA plan of 50% initial loading in one year with 3 DS3s in 30 MHz as illustrated in Appendix B, Figure 16.

H. Alcatel's Suggestion that the Joint Commenters' Possess Radios that Can Operate Under Its Plan is Erroneous and Based on False Assumptions.

ANS Argues: In this section ANS argues generally that the Joint Commenters' possess radios that can be modified to meet the 1.6 MHz based channel plan. **(32)**

JC Response: Because ANS apparently relied on an outdated list of type notified radios at the FCC, ANS makes some false assumptions about products currently manufactured by the Joint Commenters. For example, Alcatel erroneously states that TeleSciences manufactures a 64 QAM/4 DS-1/1.6 MHz radio for the 2 GHz band. TeleSciences has never manufactured such a radio. However, TeleSciences manufactured a similar product design which was over 15 years old and has long been discontinued. *See* Appendix B, Figure 6 for a listing of radio products currently available from the leading manufactures of microwave equipment.

APPENDIX B

FIGURES 1 - 16

THE TIA PLAN COMPARED TO THE ALCATEL PLAN

THE BASIC DIFFERENCES BETWEEN THE TWO PLANS

TIA PLAN			
Bandwidth (MHz)	Typical Utilization	Efficiency B/Hz	Modulation Required
2.50	4 x DS1	2.47	16 QAM
3.75	8 x DS1	3.29	32 QAM
30.00	3 x DS3	4.47	64 QAM

ALCATEL PLAN			
Bandwidth (MHz)	Typical Utilization	Efficiency B/Hz	Modulation Required
1.60	4 x DS1	3.86	64 QAM
3.20	8 x DS1	3.86	64 QAM
30.00	2 x DS3	2.98	16 QAM

The basic differences between the TIA Plan and the Alcatel Plan are the channel bandwidths required for 4 and 8 DS1 radios and their respective spectral efficiencies and the spectral efficiency required for 30 MHz radios.

The TIA Plan can accomodate Alcatel's Plan.

Alcatel's 1.6 MHz plan will fit into the 2.5 MHz TIA Plan and, likewise, for the 3.2 MHz radios fitting into the 3.75 MHz channel.

All manufacturers of 30 MHz radios, including Alcatel, meet the efficiency standard in the TIA Plan. These radios have been in production for several years.

WE BELIEVE THE TIA PLAN IS IN THE PUBLIC'S BEST INTEREST

THE TIA PLAN SERVES THE PUBLIC'S BEST INTEREST

USER BENEFITS OF THE TIA PLAN

- BETTER PATH RELIABILITY
- LOWER COST SYSTEMS
- BROADER SELECTION OF EQUIPMENT
- WIDER CHOICE OF SUPPLIERS
- REUSE OF EXITING MODEMS POSSIBLE
- IMPROVED SPECTRUM UTILIZATION
- LESS EQUIPMENT OBSOLETED

USERS CAN ACHIEVE 25 % BETTER PATH RELIABILITY WITH THE TIA PLAN

THERE IS 400% MORE DOWNTIME WITH THE ALCATEL PLAN

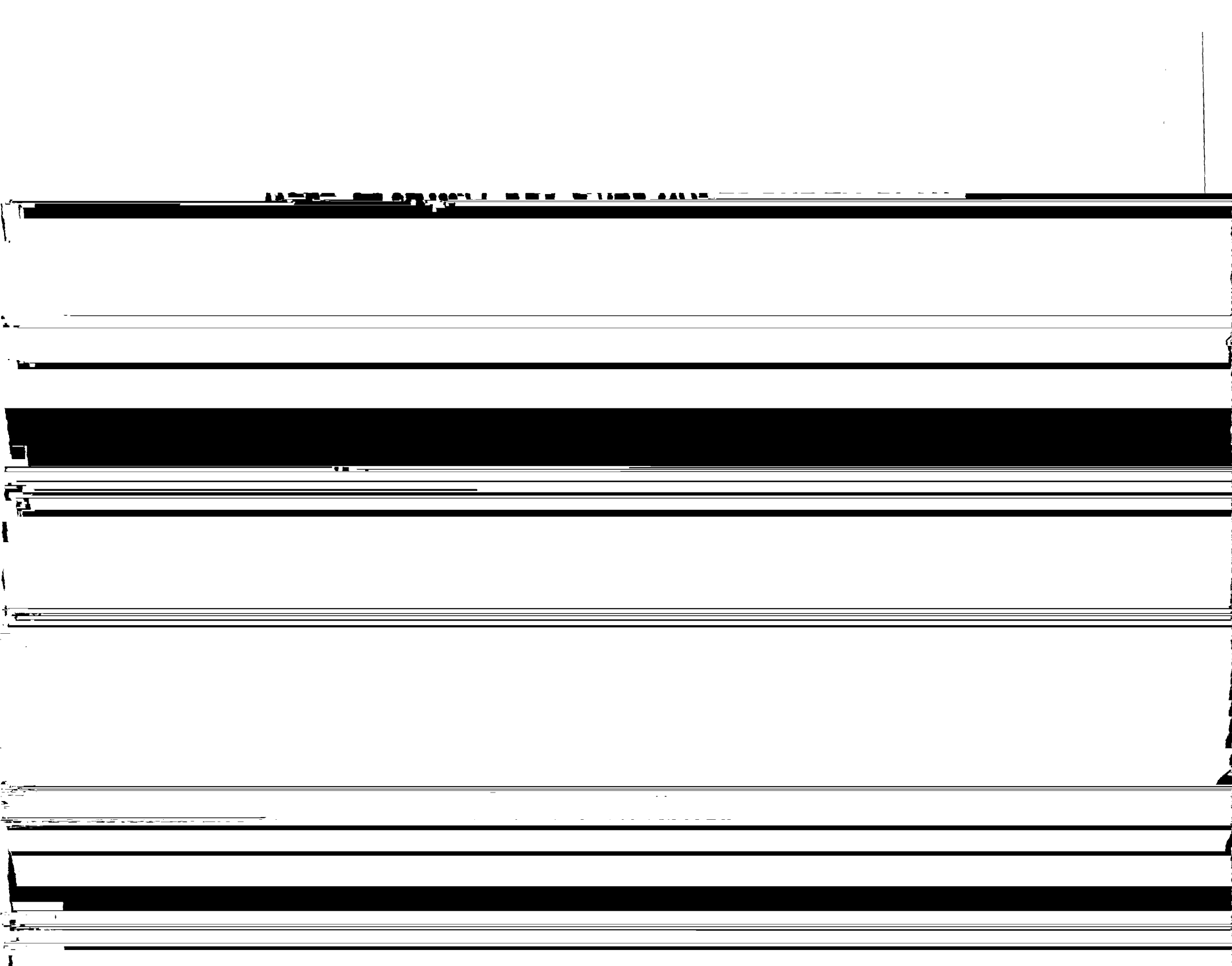
TIA PLAN		
16 QAM/2.5 MHz		
% UPTIME	% DOWNTIME	SEC/YR DOWN TIME
99.9900%	0.0100%	3,154
99.9990%	0.0010%	315
99.9999%	0.0001%	32

ALCATEL PLAN		
64 QAM/1.6 MHz		
SEC/YR DOWN TIME	% DOWNTIME	% UPTIME
12,614	0.0400%	99.9600%
1,261	0.0040%	99.9960%
126	0.0004%	99.9996%

Assumptions		
6 GHz	Frequency	6 GHz
Independent	Distance	Independent
4 DS1	Capacity	4 DS1
30 dBm	Transmit Power	30 dBm
-87 dBm	Threshold (10e-6)	-81 dBm
117 dB	System Gain	111 dB
Independent	Antenna	Independent

Appendix B

Figure 3



EQUIPMENT AVAILABILITY OF THE 4/8 DS1 RADIOS

USERS WOULD HAVE A BROADER SELECTION OF EQUIPMENT AND A WIDER CHOICE OF SUPPLIERS UNDER THE TIA PLAN

FREQ. BAND	BAND-WIDTH (MHZ)	TYPICAL UTILIZATION	VF CAPACITY	ALCATEL NETWORK SYSTEMS	DIGITAL MICROWAVE CORPORATION	HARRIS CORP. FARINON DIVISION	NORTHERN TELECOM CORPORATION	TELESCIENCES TRANSMISSION SYSTEMS, INC.
TIA PLAN								
6 GHz	3.75	8-DS1	192	MDR-5206	TBD			TELESTAR 6G/8DS1
LOWER	2.50	4-DS1	96	MDR-5306	TBD			TBD
6 GHz	3.75	8-DS1	192	MDR-5206	TBD			TELESTAR 6G/8DS1
UPPER	2.50	4-DS1	96	MDR-5306	TBD			TBD
10 GHz	3.75	8-DS1	192		QUANTUM 10	DVM 10-8T		TELESTAR 10G/8DS1
	2.50	4-DS1	96		10M-SE	Urbanet 10ec		TELESTAR 10G/4DS1
ALCATEL PLAN								
6 GHz	3.20	8-DS1	192	MDR-5206				
Lower	1.60	4-DS1	96	MDR-5306				
6 GHz	3.20	8-DS1	192	MDR-5206				
UPPER	1.60	4-DS1	96	MDR-5306				
10 GHz*	3.20	8-DS1	192					
	1.60	4-DS1	96					

*See Figure 15
TBD = To Be Developed in the next six to twelve months.

USERS' 2 GHz EQUIPMENT BEING DISPLACED FOR EMERGING TECHNOLOGIES

CURRENT PRODUCTS BEING OFFERED IN THE MARKET PLACE TODAY

FREQ. BAND	BAND-WIDTH	TYPICAL UTILIZATION	VF CAPACITY	ALCATEL NETWORK SYSTEMS	DIGITAL MICROWAVE CORPORATION	HARRIS CORP. FARINON DIVISION	NORTHERN TELECOM CORPORATION	TELESCIENCES TRANSMISSION SYSTEMS, INC.
2 GHz P 94 Analog	10 MHz	600 CH	600			FAS 2000e		STARPOINT 2000
	5 MHz	120 CH	120			FAS 2000e		STARPOINT 2000
	1.6 MHz	96 CH	96			LR4-2000		STARPOINT
	0.8 MHZ	48 CH	48			LR4-2000		STARPOINT
Digital	10 MHz	1-DS3	672	MDR-4102		DVM2-45		
	5 MHz	12-DS1	288	MDR-5402				TELESTAR 2G/8DS1
		8-DS1	192			DVM2-8T		TELESTAR 2G/12DS2
P 21	3.5 MHz	12-DS1	288	MDR-5102				TELESTAR 2G/12DS1
		8-DS1	192		QUANTUM 2	DVM2-8T		TELESTAR 2G/8DS1
		4-DS1	96			Urbanet 2ec		TELESTAR 2G/4DS1
	3.2 MHz	8-DS1	192	MDR-5202				

USERS' WOULD HAVE A MIGRATION PLAN THAT WOULD ALLOW THEM TO REUSE 2 GHz MODEMS UNDER THE TIA PLAN

FREQ. BAND	% OF 1992 LICENSING	CURRENT CHANNELS	TYPICAL UTILIZATION	NEW CHANNELS	TYPICAL UTILIZATION
2 GHz P 94 Analog	6.6%	10 MHz	600 CH	10 MHz	600 CH
	0.5%	5 MHz	120 CH	5 MHz	120 CH
	8.6%	1.6 MHz	96 CH	2.5 MHz	96 CH
	6.2%	0.8 MHZ	48 CH	1.25 MHz	48 CH
Digital	0.4%	10 MHz	1-DS3	10 MHz	1-DS3
	0.0%	5 MHz	12-DS1	5 MHz	12-DS1
P 21	77.7%	3.5 MHz	12-DS1	3.75/5.0 MHz	12-DS1
		3.5/3.2 MHz*	8-DS1	3.75 MHz	8-DS1
		3.5/1.6 MHz*	4-DS1	3.75/2.5 MHz	8/4-DS1

ALCATEL EQUIPMENT IS ACCOMMODATED UNDER THE TIA PLAN

*** The FCC authorized bandwidth is 3.5 MHz. It is unknown why Alcatel does not offer 3.5 MHz radios for these capacities. Alcatel does offer a 3.5 MHz 12 DS1 radio. (See Figure 6)**

THE TIA PLAN FOR CHANNEL BANDWIDTHS AND EFFICIENCY ARE DERIVED FROM THE LOWER 6 GHz AND 10 GHz BANDS

		Current FCC Rules **		TIA Proposed Rules		
N	Bandwidth (MHz)	VF Channels	Equivalent DS1	VF Channels	Equivalent DS1	Efficiency (B/Hz)
1	30.00	1152	48	2016	84	4.47
2	15.00	576	24	n/a	n/a	n/a
3	10.00	384	16	672	28	4.47
6	5.00*	192	8	288	12	3.70
8	3.75*	144	6	192	8	3.29
12	2.50*	96	4	96	4	2.47
24	1.25*	48	2	48	2	2.47

The TIA Plan basically is stating that the more spectrum you use the more efficiently it must be used.

The 10 GHz Band is currently the only band in use today above 2 GHz with a narrow band channel plan. It has been used as an alternate band for 2 GHz users when 2 GHz spectrum is not available due to frequency congestion. The 10 GHz band has been fulfilling these user needs now for several years.

*** Under 10 GHz Band**

****Under 6 GHz Common Carrier Rules**

2.5 MHz CHANNEL PLANS RECOMMENDED BY CCIR

10 GHz	**CCIR rec 747, Annex 2**
15 GHz	**CCIR rec 636, Annex 2**
23 GHz	**CCIR rec 637**
27 GHz	**CCIR rec 748**
38 GHz	**CCIR rec 749**
55 GHz	**CCIR 9B/TEMP/41**

WE ARE UNAWARE OF 1.6 MHz CHANNEL PLAN OUTSIDE THE U.S.

USERS CAN EXPAND THEIR SYSTEMS IN THE SAME RF BANDWIDTH UNDER THE TIA PLAN

Bandwidth (MHz)	Typical Utilization	Efficiency B/Hz	Modulation Required	Growth Utilization	Efficiency B/Hz	Modulation Required
1.25	2 x DS1	2.47	16 QAM	4 x DS1	4.94	128 QAM
2.50	4 x DS1	2.47	16 QAM	8 x DS1	4.94	128 QAM
3.75	8 x DS1	3.29	32 QAM	12 x DS1	4.94	128 QAM
5.00	12 x DS1	3.70	64 QAM	16 x DS1	4.94	128 QAM

TeleSciences already employs 128 QAM technology in 2 and 10 GHz radios.

Alcatel already employs 256 QAM technology in 2 GHz radios to provide 12 T1's in 3.5 MHz.

SPECTRAL EFFICIENCY OF THE 4/8 DS1 RADIOS

USERS CAN MAKE MORE EFFICIENT USE OF THE SPECTRUM UNDER THE TIA PLAN

BAND-WIDTH (MHz)	MINIMUM UTILIZATION per RADIO (DS1)	TOTAL UTILIZATION IN 30 MHz (DS1)	MAXIMUM UTILIZATION per RADIO (DS1)	TOTAL UTILIZATION IN 30 MHz (DS1)
TIA PLAN				
2.50	4	48	8	96
3.75	8	64	12	96
ALCATEL PLAN				
1.60	4	72	4	72
3.20*	8	48	8	48

* Occupies 5 MHz

ONLY THE TIA PLAN OFFERS THE USERS THE FLEXIBILITY TO GROW IN THE SAME RF BANDWIDTH

BEFORE GROWTH	TIA Plan	Alcatel Plan
Typical Utilization	4 DS1	4 DS1
Occupied Bandwidth	2.5 MHz	1.6 MHz
Spectral Efficiency	2.47 b/Hz	3.86 b/Hz
Typical Modulation Required	16 QAM	64 QAM
AFTER GROWTH		
Growth Utilization	8 DS1	8 DS1
Occupied Bandwidth	2.5 MHz	1.6 MHz
Spectral Efficiency	4.94 b/Hz	7.72 b/Hz
Typical Modulation Required	128 QAM*	512 QAM**

* 128 QAM and 256 QAM radios are commonly used today. TeleSciences and Alcatel already supply radios with this type of spectral efficiency.

** 512 QAM modulation is not a proven technology for narrow band radios.

ALCATEL'S CHANNEL PLAN IN REALITY IS ONLY A 5 AND 30 MHz PLAN

5 AND 30 MHz CHANNELS ARE ALWAYS USED FOR GROWTH

THIS MAKES ALCATEL'S PLAN SPECTRALLY INEFFICIENT

Typical Utilization	**4 DS1****	**1 DS3**
Occupied Bandwidth	**1.6 MHZ**	**10 MHz**
Occupied bandwidth spectral efficiency	**3.86 b/Hz**	**4.47 b/Hz**
Spectrum reserved for growth*	**5.0 MHZ**	**30 MHz**
True spectral efficiency	**1.24 b/Hz**	**1.44 b/Hz**

*** User's block out this much spectrum with frequency coordination houses, therefore preventing other users from using the spectrum.**

The joint commenters' are opposed to growth by blocking frequencies. Growth can be achieved by higher order modulation as seen in Figure 10.

**** The Alcatel plan does not provide a growth plan for an 8 DS1 user occupying 3.2 MHz of bandwidth.**

CURRENT EQUIPMENT THAT BECOMES OBSOLETE UNDER BOTH PLANS

THE INDUSTRY NEEDS 5 YEARS BEFORE OBSOLETING THESE RADIOS

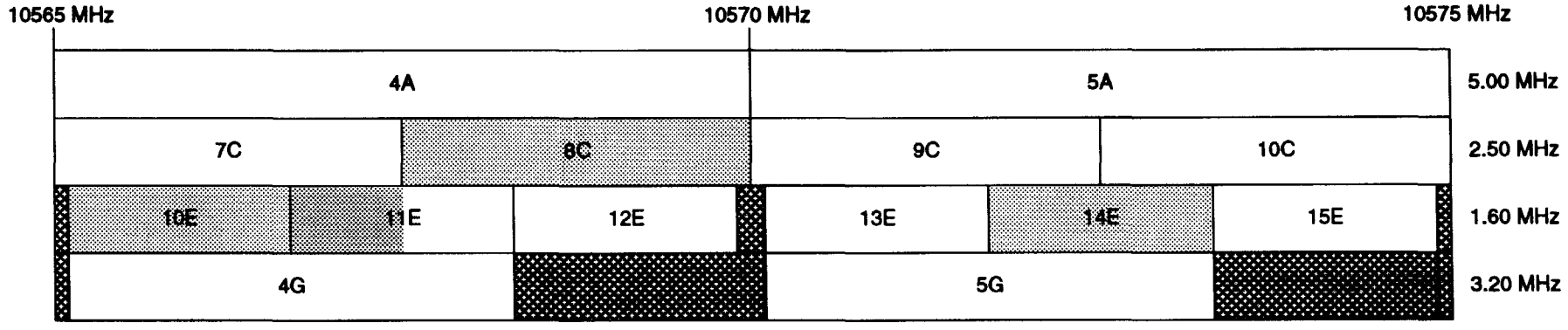
FREQ. BAND	BAND-WIDTH	TYPICAL UTILIZATION	VF CAPACITY	ALCATEL NETWORK SYSTEMS	DIGITAL MICROWAVE CORPORATION	HARRIS CORP. FARINON DIVISION	NORTHERN TELECOM CORPORATION	TELESCIENCES TRANSMISSION SYSTEMS, INC.
6 GHz LOWER	30 MHz	2-DS3	1344	MDR-4206		DM 6 -90		
	15 MHz	1-DS3	672		QUANTUM 6			
	10 MHz	16-DS1	384		QUANTUM 6			
	5 MHz	8-DS1	192		QUANTUM 6	DVM6-8T		TELESTAR 6G/8DS1
	3.75 MHz	4-DS1	96					TELESTAR 6G/4DS1
6 GHz UPPER Digital	10 MHz	16-DS1	384	DTR-26	QUANTUM 6			
	5 MHz	8-DS1	192	DTR-13	QUANTUM 6	DVM6-8T		TELESTAR 6G/8DS1
	5 MHz	4-DS1	192					TELESTAR 6G/4DS1
11 GHz	30 MHz	2-DS3	1344	MDR-4211		DM 11-90		
	15 MHz	1-DS3	672	MDR-4111A	QUANTUM 11	DM 11-45		
	10 MHz	16-DS1	672		QUANTUM 11			
	10 MHz	12-DS1	384	MDR-5111				
	5 MHz	8-DS1	192		QUANTUM 11			

It takes approximately $3 Million and 2 years just to develop one frequency band.

Most of these products were recently developed and first shipments are occurring in 1993.

It would be an economic hardship for manufacturers if they could not get an ROI on these products.

ALCATEL'S 10 GHz CHANNEL PLAN IS SPECTRALLY INEFFICIENT and IMPRACTICAL*



The use of channel 10E and 8C would leave 800 KHz of spectrum at channel 11E fallow.

The use of channel 14E would preclude the use of channels 9C and 10C.

The Alcatel plan would only allow 13 pairs of 8 DS1 channels as compared to 17 pairs under the TIA plan.

The TIA plan for 2.5 MHz will not meet the spectral efficiency of 3.86 B/Hz as required under the Alcatel plan.

There is no provision for the additional use of 3.75 MHz channels into the old point-to-multipoint part of the band.

For these reasons the Alcatel plan effectively eliminates the use of the TIA channel plan.

See Appendix C, Figure D for the TIA 10 GHz recommended channel plan.

* Only a portion of the 10 GHz band is shown for illustration.

TIA Recommended Rules

Bandwidth (MHz)	Typical Utilization	Equivalent VF Channels	Efficiency (B/Hz)	Initial Loading
40.00	4 DS3	2688	4.47	50%
30.00	3 DS3	2016	4.47	50%
20.00	2 DS3	1344	4.47	50%
10.00	1 DS3	672	4.47	n/a
5.00*	12 DS1	288	3.70	n/a
3.75*	8 DS1	192	3.29	n/a
2.50*	4 DS1	96	2.47	n/a
1.25*	2 DS1	48	2.47	n/a

All authorized bandwidths are defined.

The greater the bandwidth the better the spectrum efficiency (B/Hz).

Initial loading is for the first year.

APPENDIX C

RECOMMENDED CHANNEL PLANS
and
CENTER FREQUENCIES

for the
4, Lower 6, Upper 6, 10, and 11 GHz
FREQUENCY BANDS

CHANNEL PLANS

4 GHz (3700 - 4200 MHz) Channel Plan (See Figure A)

The joint commenters believe that the 4 GHz band is inappropriate for displaced 2 GHz users. This band remains severely congested due to the shared use with satellite. We believe though, it makes sense to allow existing systems to upgrade to take advantage of new technologies. Northern Telecom has developed a SONET radio that has the equivalent of 6 DS3s capacity. This operates in 40 MHz of spectrum. By stacking 20 MHz channels for existing networks, users can take advantage of this new technology.

We propose maintaining the existing channel plan and T/R spacing to minimize interference with satellite users and stacking the existing 20 MHz channels for 40 MHz operation. See Appendix A, page 1, for details.

Bandwidth	Pairs
40 MHz	6 Pairs
20 MHz	12 Pairs

Lower 6 GHz (5,925 - 6,425 MHz) Channel Plan (See Figure B)

The Lower 6 GHz band is an ideal band to use for displaced 2 GHz users. We recommend that two of the eight 30 MHz channel pairs be subdivided into narrow band channels. These narrow band channels should only be used when the Upper 6 GHz band is exhausted. This will preserve the wide band channels for as long as possible. The balance of the 30 MHz channels are subdivided to into 10 and 15 MHz channels. The 15 MHz channels are temporary and should be discontinued by June 30, 1998. This would allow manufactures to get a return on their investment. Also, the guard bands should be subdivided into narrow band channels.

This frequency plan is based on 29.65 MHz channel spacing. This frequency plan is known as the "T" plan of which 90 % of all existing installations utilize. However, we are recommending that the 30 MHz authorized bandwidth still be allowed, which is the current practice. See Appendix A, pages, 2 - 4 for details.

Bandwidth	Spacing	Pairs
30.00 MHz	29.65 MHz	8 Pairs
1 5.00 MHz	14.82 MHz	16 Pairs
10.00 MHz	9.88 MHz	24 Pairs
5.00 MHz	4.94 MHz	12 Pairs
3.75 MHz	3.70 MHz	16 Pairs
2.50 MHz	2.47 MHz	28 Pairs
1.25 MHz	1.23 MHz	56 Pairs